

## REMARKS

Claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 22-27, 29, 30, 32-34, 37, 38 and 40-56 are currently pending in the present application. Claims 1, 12, 22, 29, 38, 46, 51, 53 and 55 have been objected to. Claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 22-27, 29, 30, 32-34, 37, 38 and 40-56 are rejected under 35 U.S.C. § 103.

Claims 1, 12, 22, 29, 38, 46, 51, 53 and 55 have been amended. No claims are added or canceled by this amendment. Therefore, claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 22-27, 29, 30, 32-34, 37, 38 and 40-56 will remain pending in the application after entry of the foregoing claim amendments. Claims 1, 12, 22, 29, 38, 46, 51, 53 and 55 are independent claims. Support for amendments can be found through the as-filed application, such as, for example, at paragraph [0078]. Applicants have amended ¶[0087] of the specification to correct minor typographical errors. No new matter has been added. Reconsideration of the present application is respectfully requested in view of the foregoing amendments and following remarks.

### Telephone Conversation with Examiner

Examiner Stace is thanked for the telephone conversation conducted on May 8, 2009. Proposed claim amendments and the cited arts were discussed. Partially persisting log entries, and storing log entries from an upper layer and an allocation layer in a single log into were discussed. Examiner Stace indicated that he will consider the amendments and remarks submitted in the formal reply.

### Claim Objections

Claims 1, 12, 22, 29, 38, 46, 51, 53 and 55 have been objected as allegedly containing an intended use limitation. These claims have been amended to recite “associating said plurality of log entries with each other for ~~use in~~ determining whether the single B-link tree operation has

been completed” (*emphasis added*). Accordingly, withdrawal of the claim objections is respectfully requested.

**Claim Rejections – 35 U.S.C. § 103**

Claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 22-27, 29, 30, 32-34, 37, 38 and 40-56 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,485,608 to Lomet et al. (“Lomet”) in view of one or more of “Efficient Locking for Concurrent Operations on B-Trees” (“Lehman”) and U.S. Patent No. 5,434,994 to Shaheen et al. (“Shaheen”). Without conceding the merits of the rejection, Applicants have amended independent claims 1, 12, 29, 38, 51 and 53 to further clarify the claimed subject matter.

Lomet, Lehman, and Shaheen, whether considered individually or in any combination, neither disclose nor suggest “storing said plurality of log entries in a *single* log” as recited in amended independent claims 1 and 12, “maintaining a *single* log, where the single log is partitioned into an upper layer and an allocation layer” as recited in independent claims 22 and 55, “a *single* storage log for storing said plurality of log entries” as recited in amended independent claim 29, “a *single* finite storage log for storing said plurality of log entries” as recited in amended independent claim 38, “the *single* log is partitioned into an upper layer and an allocation layer” as recited in independent claim 46, “storing said plurality of log entries into a *single* log” as recited in amended independent claim 51, or “storing said plurality of log entries into a *single* finite log” as recited in amended independent claim 53.

The claimed subject matter includes a log that stores log entries from a B-link tree layer and an allocation layer. Storing log entries that in a *single* log for multiple layers enables fast recovery. (Specification, ¶[0078]). For example, a naïve implementation of the logging the B-link tree layer and the allocation layer may maintain two separate logs, one for each layer. However, in a large scale system, this naïve implementation leads to bad performance because two log writes must be performed. For example, they system may need to position the actuator of a disk to a first position for the first log and then seek and write to a second position for the

second log, and eventually re-seek to the first position for the next logging operation. (*Id.*). Thus, claimed subject matter stores log entries from both the B-link tree layer and the allocation layer in a *single* log.

Lomet does not teach or suggest storing log entries that include entries from both an allocation layer and a B-link tree layer in a *single* log. Lomet discloses the use of logging with respect to sections of data in general. More specifically, Lomet uses three types of logs in persistent storage (*i.e.* redo logs, undo logs, and archive logs) log data transactions. (Lomet, col. 5, lines 1-3.) Moreover, Lomet discloses a system that includes several nodes (*Id.* at col. 4, lines 21-23), and each node includes two types of buffers (*i.e.* redo buffers and undo buffers) in its cache. (*Id.* at col. 5, lines 5-6.) Therefore, Lomet does not disclose or suggest storing log entries that in a *single* log.

Neither Lehman nor Shaheen, whether considered individually or in combination, overcomes the shortcomings of Lomet. The Office Action dated 02/26/2008 cites Shaheen as allegedly disclosing storing log entries in a single log. In particular, the Office Action points out that Shaheen discloses merging modification logs from the participating servers (Office Action dated 02/26/2008, page 3, point 4). Shaheen is directed to a system for maintaining replicated data in a data processing system that includes one or more participating servers (Shaheen, Abstract). In Shaheen, data updates are logged for each server in *separate* modification logs. (See Shaheen, col. 5, lines 17-18). Therefore, the Shaheen system maintains multiple logs. While the individual modification logs may be merged into a merged log, the transitory merged log is sent back to the participating servers. (Shaheen, col. 4, lines 62-66). As each participating server receives a merged log, the Shaheen system as a whole has *multiple* merged logs. Therefore, Shaheen fails to teach or suggests storing log entries that in a *single* log.

Accordingly, for the foregoing reasons, Lomet, Lehman, and Shaheen, whether considered individually or in any combination, neither disclose nor suggest the subject matter in independent claims 1, 12, 22, 29, 38, 46, 51, 53, and 55.

Claims 2, 4-6, 9, 10, 14-16, 19, 20, 23, 26, 27, 30, 32-34, 37, 40-45, 47, 50, 52, 54, and 56 depend upon one of claims 1, 12, 22, 29, 38, 46, 51, 53, and 55. Therefore, for at least the reasons set forth for claims 22, 46, and 55, Applicants respectfully submit the dependent claims are so patentably distinct over Lomet, Lehman, and Shaheen.

Accordingly, because Lomet, Lehman, and Shaheen, whether considered individually or in any combination, neither disclose nor suggest “storing said plurality of log entries in a *single* log”, “maintaining a *single* log, where the single log is partitioned into an upper layer and an allocation layer”, “a *single* storage log for storing said plurality of log entries,” “a *single* finite storage log for storing said plurality of log entries”, “the *single* log is partitioned into an upper layer and an allocation layer” “storing said plurality of log entries into a *single* log” or “storing said plurality of log entries into a *single* finite log” it is requested that the rejection of claims 1, 2, 4-6, 9, 10, 12, 14-16, 19, 20, 22-27, 29, 30, 32-34, 37, 38 and 40-56, under 35 U.S.C. § 103, be reconsidered and withdrawn.

**CONCLUSION**

In view of the foregoing amendments and remarks, Applicants respectfully submit that the claims are allowable and that the present application is in condition for allowance. Reconsideration of the application and an early Notice of Allowance are respectfully requested. In the event that the Examiner cannot allow the present application for any reason, the Examiner is encouraged to contact the undersigned to discuss the resolution of any remaining issues.

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**/Joseph F. Oriti/**  
Joseph F. Oriti  
Registration No. 47,835

Woodcock Washburn LLP  
Cira Centre  
2929 Arch Street, 12th Floor  
Philadelphia, PA 19104-2891  
Telephone: (215) 568-3100  
Facsimile: (215) 568-3439